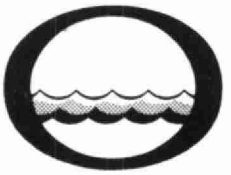
1970 OPERATING SUMMARY

WATERDOWN

water pollution control plant

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations



Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 195
Ontario

Once again we have the privilege of submitting to you our latest detailed report on financial progress and technical activity at your water pollution control plant.

The statistical information contained in this annual operating summary will undoubtedly be a useful barometer of efficiency. Of particular interest will be the comments and recommendations of the regional operations engineer, who was intimately connected with day-to-day operation throughout 1970.

Together with the extensive cost data provided, this information should assist greatly in your general understanding of the problems met and dealt with, and in furnishing a yardstick for possible future expansion.

D. S. Caverly,
General Manager.

D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

CONTENTS

WATERDOWN

water pollution control plant

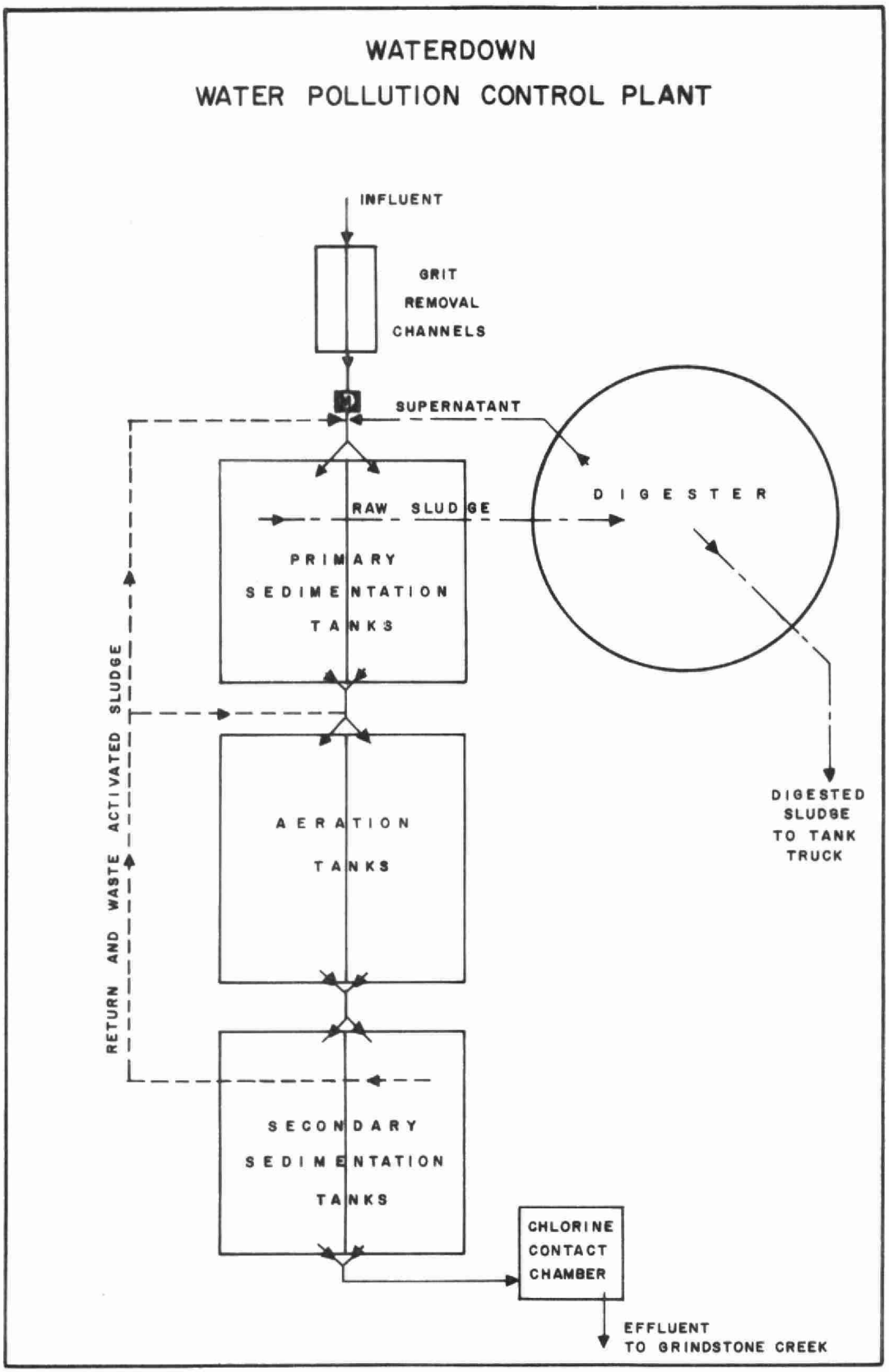
operated for the

TOWN OF WATERDOWN

by the

ONTARIO WATER RESOURCES COMMISSION

1970 ANNUAL OPERATING SUMMARY


WATERDOWN
WATER POLLUTION CONTROL PLANT
INFLUENT
GRIT
REMOVAL
CHANNELS
SUPERNATANT
DIGESTER
RAW SLUDGE
PRIMARY
SEDIMENTATION
TANKS
RETURN AND WASTE ACTIVATED SLUDGE
AERATION
TANKS
DIGESTED
SLUDGE
TO TANK
TRUCK
SECONDARY
SEDIMENTATION
TANKS
CHLORINE
CONTACT
CHAMBER
EFFLUENT
TO GRINDSTONE CREEK

DESIGN DATA

PROJECT NO. 2-0163-63

DESIGN FLOW 0.30 mgd TREATMENT Activated Sludge

PRIMARY TREATMENT

Screening

Type: Manually cleaned
Size: One 2" spacing

Grit Removal

Type: Channel, manually cleaned

Primary Sedimentation

Type: Walker Process CRP
Size: Two 30' x 8' x 8' (24,000 gal)
Retention: 1.9 hours
Loadings: Surface 625 gal/ft^2/day
Weir 6,520 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air, single-pass
Size: Two 50' x 14' x 11' (15,400 ft^3 or 96,000 gal)
Retention: 7.7 hours

Air Supply

Type: Aerzener Blowers
Size: Two 600 cfm

Diffusers

Type: Chicago Pump Discïusers
Spacing: 48 (total) @ 2' centres

Secondary Sedimentation

Type: Walker Process CR
Size: Two 30' x 8' x 11' (33,000 gal)
Retention: 2.6 hours
Loading: Surface 625 gal/ft^2/day
Weir 6,520 gal/ft/day

CHLORINATION

- One F & P 2-40 lb/day

Chlorine Contact Chamber

Size: 6' x 17' x 8'-9" (5,600 gal)
Retention: 27 minutes

OUTFALL

- to Grindstone Creek

SLUDGE HANDLING

Digestion System - single stage
Type: Fixed steel cover, mixed by recirculation
Size: One 30' dia x 17' swd (15,100 ft^3 or 94,000 gal)

'70 REVIEW

GENERAL

During the first three months of the year difficulties were experienced with the float control in the Parshall flume and as a result the flows recorded during that period are based on records for 47 of the 90 days.

An oil-type waste in the raw sewage was experienced on a number of occasions and at times played havoc with the plant process. Efforts to locate the source of this waste were not successful. A concerted effort will be made by the plant operator should there be a serious recurrence of this problem in 1971.

The digester was emptied in the fall and inspected. No difficulties were experienced with thick sludge, loading time, etc., during the cleanout of this digester.

Preparations are presently underway to sewer the north-east section of the Town and construction should start late in 1971 or early 1972.

An underground submersible type pumping station will also be installed in this area to pump the sewage to an elevation from which gravity-flow to the plant can take place.

EXPENDITURES

Total operating costs increased from $11,294.85 in 1969 to $14,985.03 in 1970. This was due mainly to increased payroll costs which resulted from additional supervisory requirements in 1970.

PLANT FLOWS and CHLORINATION

The total estimated flow of 23.5 million gallons was seven percent greater than the recorded flow in 1969 and 11% greater than the flows in 1968. The average daily flow of 0.073 mg was equivalent to approximately 24% of the plant's design capacity of 0.3 mgd.

An average chlorine dosage of 1.4 mg/l was required to maintain a residual of 0.5 mg/l for a 15 minute contact period during the winter months and 1.0 mg/l during the summer months. The higher residual was maintained in summer to ensure a complete bacteria kill.

FLOWS	DAILY FLOW mil gal	OCCURRING IN THE MONTH OF	MONTHLY FLOW mil gal	OCCURRING IN THE MONTH OF
Average	.07	—	2.0	—
High	.19	April	3.96	November
Low	.03	January	1.22	August

PLANT EFFICIENCY

The average raw sewage strength was 275 mg/l BOD and 289 mg/l suspended solids. This represents a decrease in BOD and suspended solids concentrations of 20% from 1969. The removal efficiency for BOD was unchanged at 96% from 1969 and for suspended solids was five percent less at 91%.

AERATION

The organic loading to the aeration section averaged 0.05 pounds BOD per day per pound of mixed liquor suspended solids. The average mixed liquor suspended solids concentration was 2, 760 mg/l.

SLUDGE DIGESTION and DISPOSAL

A total of 255, 000 gallons of raw sludge was pumped to the digester. Approximately 22, 000 gallons were returned to the plant process as supernatant and the remainder hauled from the plant by tank truck.

CONCLUSIONS

The hydraulic loading to the plant averaged approximately 0.07 mgd, approximately 24% of the plan's dry weather design capacity. The organic loading to the plant decreased by approximately 20% indicating that the increased flows were due mainly to either surface or ground water infiltration or both.

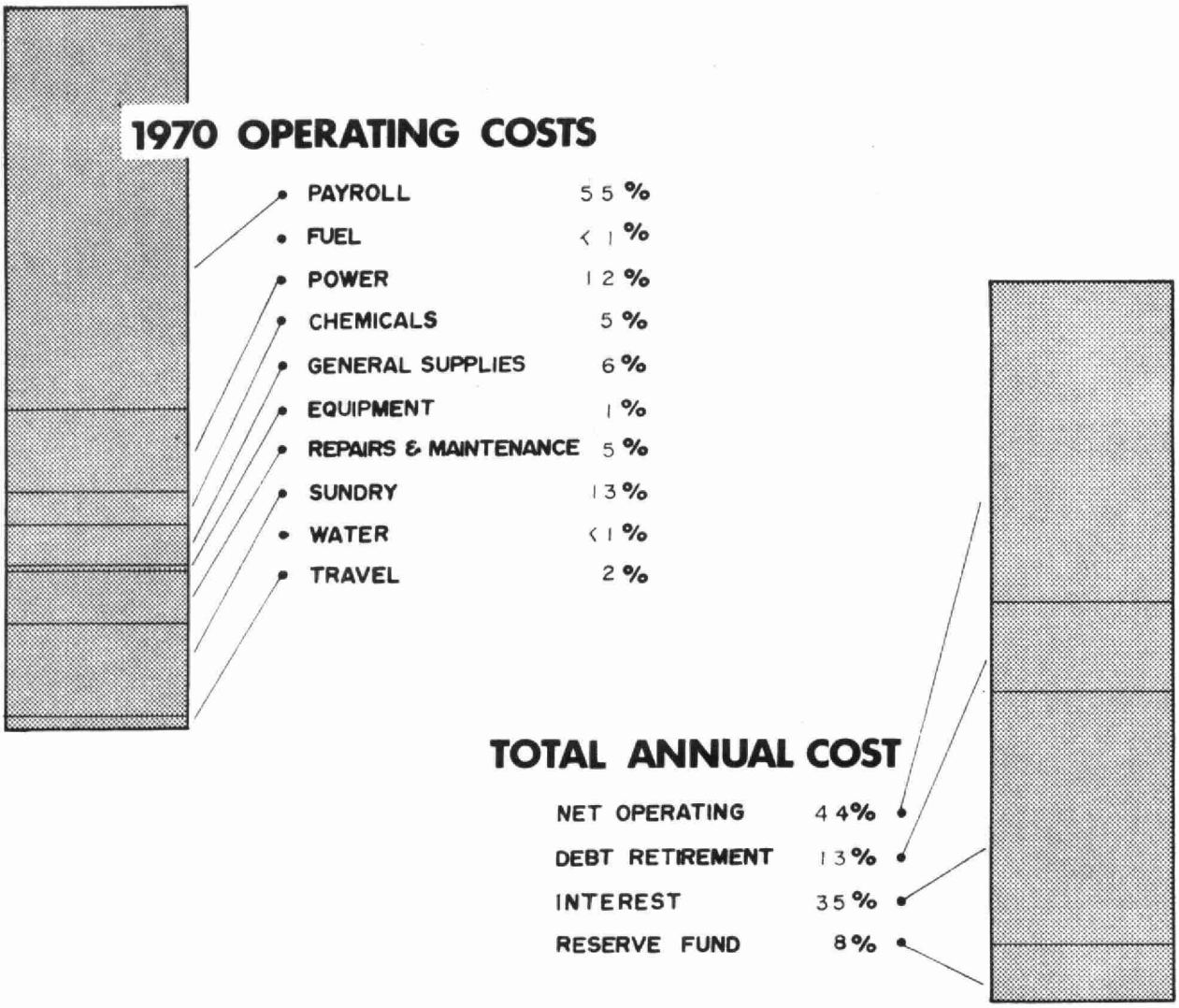
The construction of sewers and an underground station in the north east section of Town should be underway late in 1971 or early 1972.

PROJECT COSTS

NET CAPITAL COST (Final)	$475,418.08
DEDUCT - Portion financed by CMHC/MDLB (Final)	260,862.92
Long Term Debt to OWRC	$214,555.16
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1970	$ 26,128.30
Net Operating	$ 14,985.03
Debt Retirement	4,330.00
Reserve	2,573.25
Interest Charged	12,020.71
TOTAL	$ 33,908.99

RESERVE ACCOUNT

Balance @ January 1, 1970	$ 11,967.08
Deposited by Municipality	2,573.25
Interest Earned	836.37
	$ 15,376.70
Less Expenditures	-
Balance @ December 31, 1970	$ 15,376.70



Yearly Operating Costs

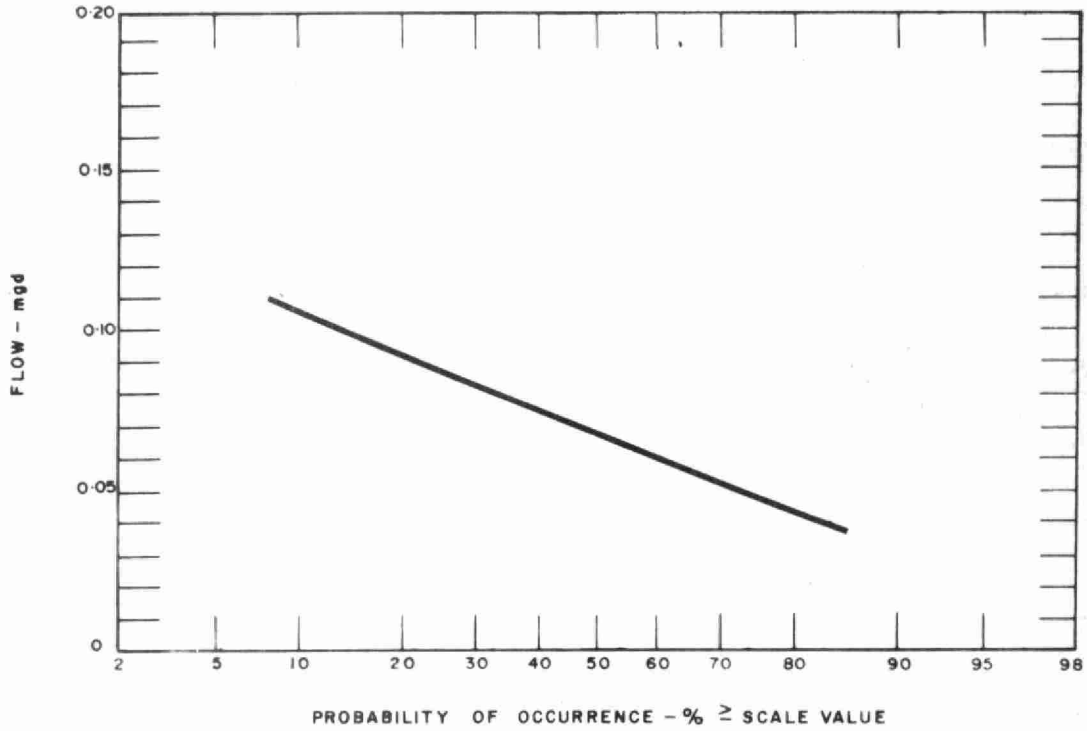
YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1967	21.90	$13,585.15	$620.33	30 cents
1968	21.22	12,065.26	568.58	23 cents
1969	22.00	11,294.85	513.40	15 cents
1970	26.6	14,985.03	562.50	26 cents

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY	WATER	TRAVEL
JAN	741.43	545.66	-	-	116.33	-	65.96	13.48	-	-	-	-
FEB	458.31	-	-	19.93	142.58	-	47.25	90.58	106.23	30.14	6.00	15.60
MAR	433.53	-	-	26.51	136.03	132.30	81.91	(7.02)	12.73	51.07	-	-
APR	2374.16	1935.49	-	25.47	193.03	-	81.62	-	-	103.30	6.00	29.25
MAY	986.63	632.10	-	16.73	128.63	-	-	-	-	195.07	-	14.10
JUNE	370.41	-	-	-	150.85	-	39.05	-	-	169.98	10.53	-
JULY	2025.69	1509.91	-	2.92	143.83	174.35	79.63	-	-	96.00	-	19.05
AUG	516.59	-	-	1.80	147.68	-	8.00	71.09	106.00	176.02	6.00	-
SEPT	2045.95	1449.62	-	-	153.28	-	99.61	-	7.07	317.92	-	18.45
OCT	1229.69	725.72	-	-	143.78	203.42	37.75	-	-	69.07	31.20	18.75
NOV	1168.18	828.58	-	4.68	136.23	-	154.53	-	10.50	33.66	-	-
DEC	2634.46	679.61	-	11.33	150.33	174.35	178.73	-	542.26	636.35	33.15	228.35
TOTAL	14985.03	8306.69	-	109.37	1742.58	684.42	874.04	168.13	784.79	1878.58	92.88	343.55

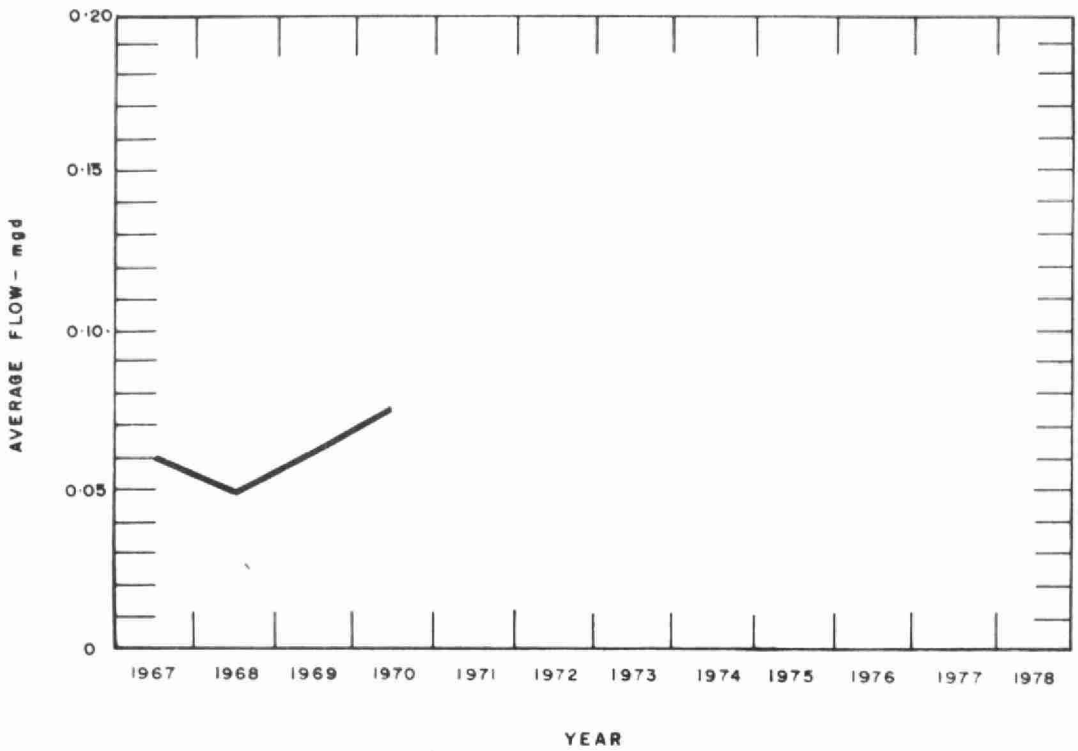
BRACKETS INDICATE CREDIT

PROCESS DATA



FLOWS

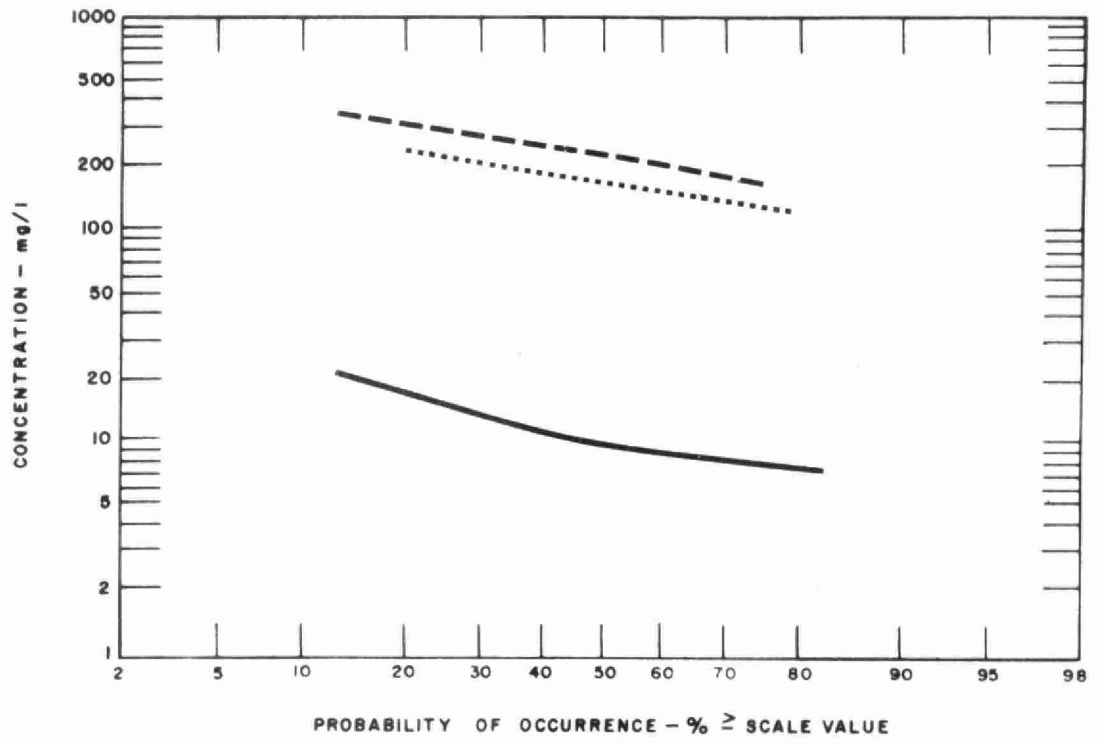
NOMINAL CAPACITY 0·3 M.G.D.



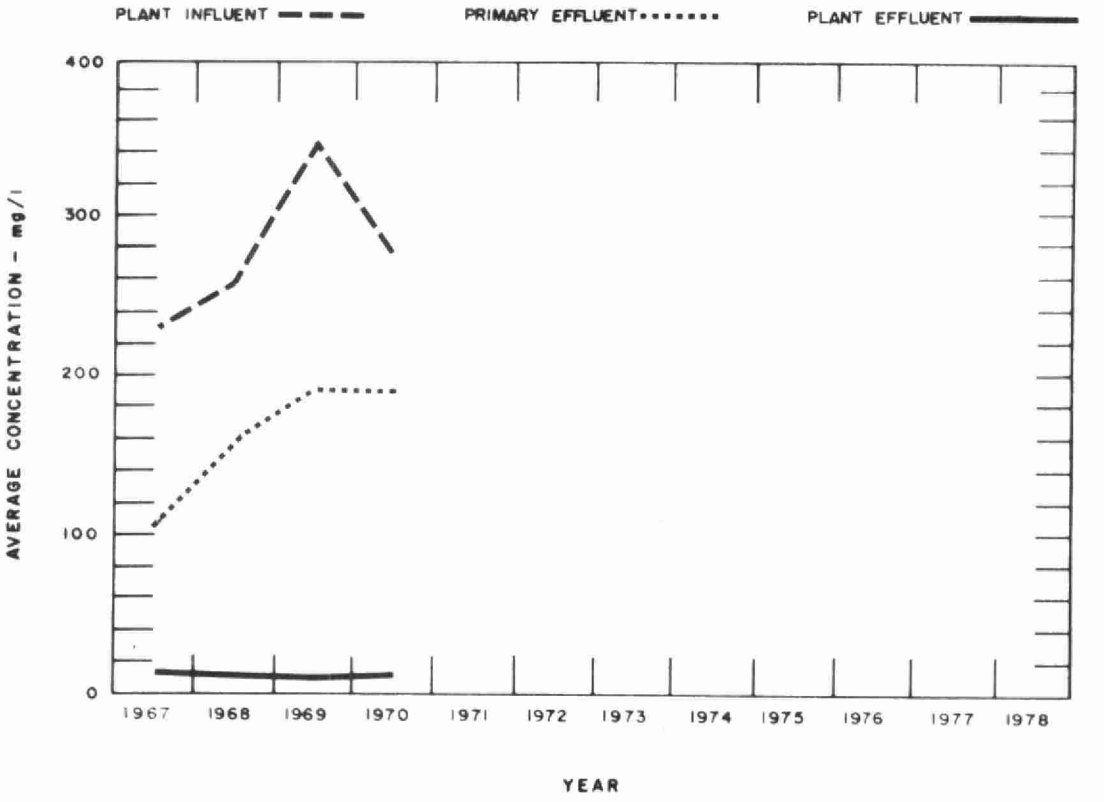
PLANT FLOWS and CHLORINATION

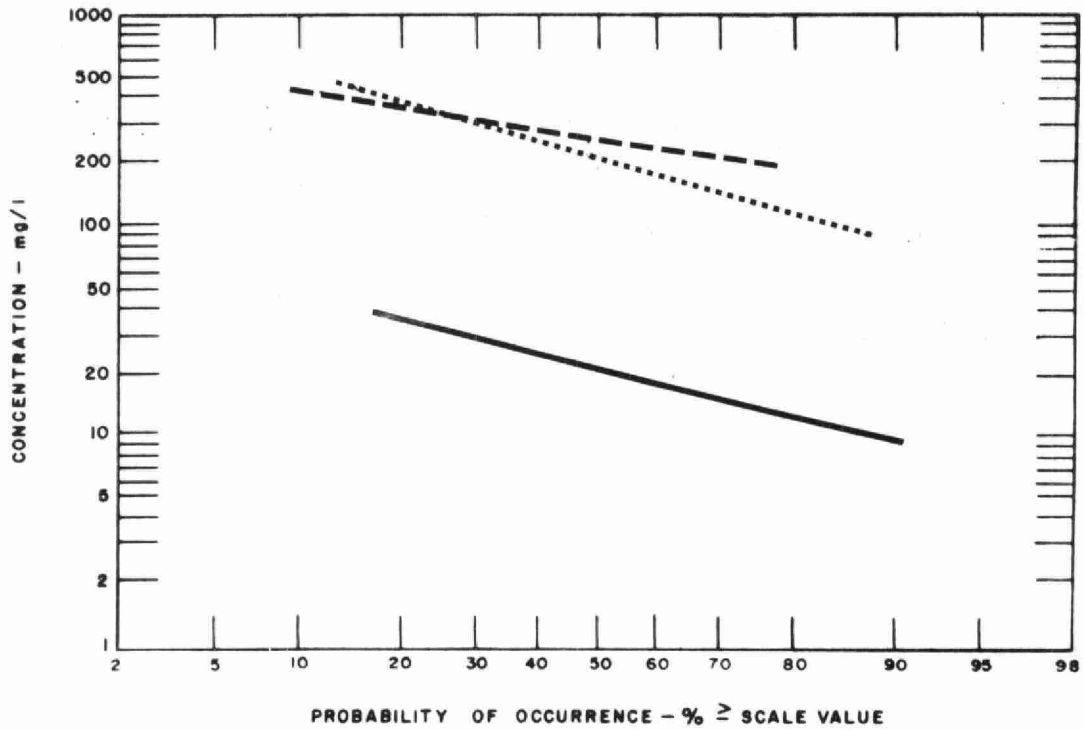
MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED pounds	DOSAGE mg/l
JAN	.83 (a)	.040	.05	.03	260	6.7
FEB	.48 (b)	.044	.07	.04	180	3.8
MAR	1.16 (c)	.077	.11	.05	210	1.8
APR	2.61	.098	.19	.06	260	1.0
MAY	2.21	.071	.09	.05	240	1.1
JUNE	1.59	.053	.08	.03	200	1.3
JULY	1.28	.041	.07	.03	380	3.0
AUG	1.22	.040	.08	.03	370	3.0
SEPT	2.03	.068	.09	.04	260	1.3
OCT	2.75	.089	.18	.05	380	1.9
NOV	3.96	.132	.14	.09	340	.9
DEC	3.46	.112	.16	.07	230	.7
TOTAL	-	-	-	-	3300	-
AVERAGE	-	.073	-	-	270	1.4

Note (a) 21 days
(b) 11 days
(c) 15 days

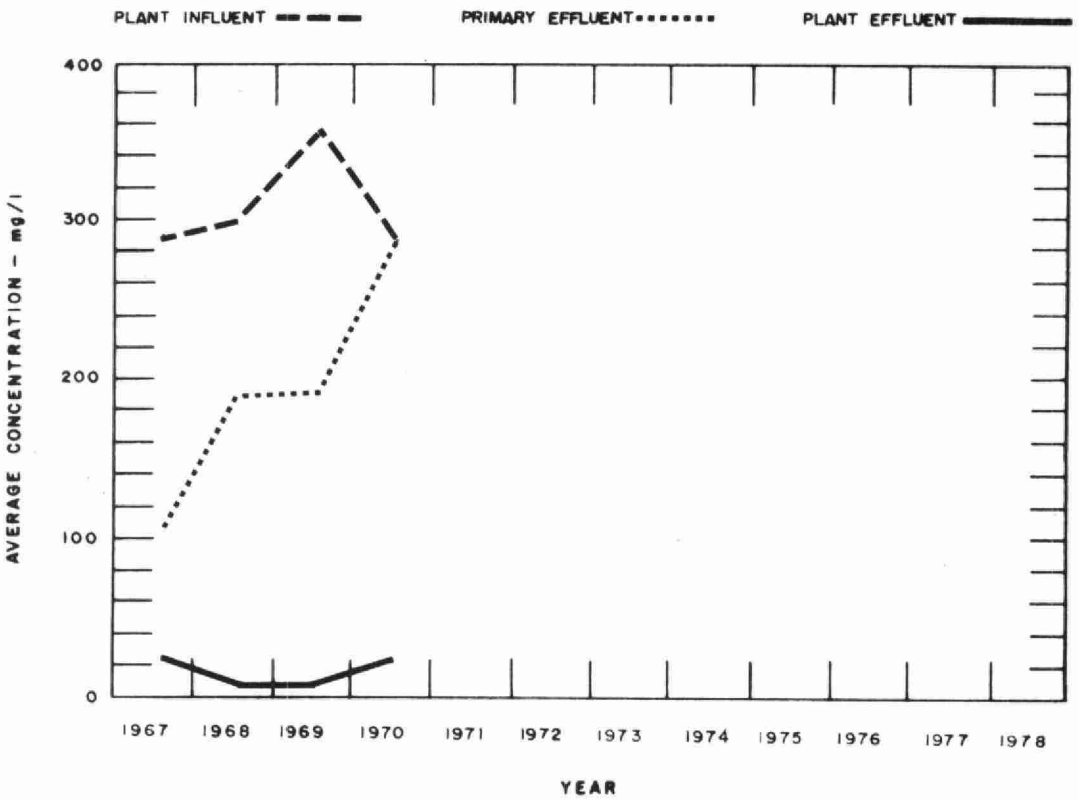


BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS



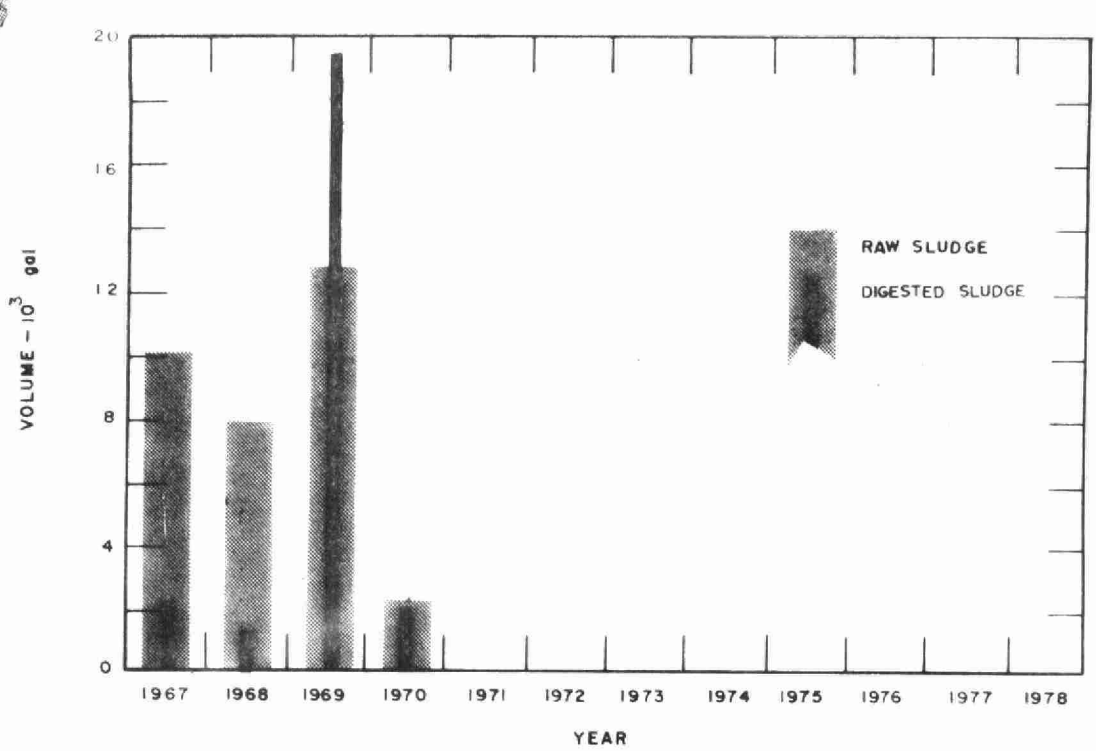
PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND						SUSPENDED SOLIDS						GRIT REMOVED
	INFLUENT		EFFLUENT		REDUCTION		INFLUENT		EFFLUENT		REDUCTION		
	n	mg/l	n	mg/l	%	10^3 pounds	n	mg/l	n	mg/l	%	10^3 pounds	cu ft
JAN	1	240	1	22	91	2	2	445	2	20	96	4	12
FEB	2	370	2	8	98	1	2	290	2	10	97	1	12
MAR	2	220	2	13	94	2	4	264	2	8	97	3	9
APR	2	110	2	8	93	3	3	219	3	58	73	4	15
MAY	2	245	2	8	97	5	4	316	4	19	94	6	18
JUNE	3	247	3	9	96	4	5	276	4	18	94	4	13
JULY	2	750	2	23	97	10	5	464	4	29	94	6	11
AUG	2	320	2	12	96	4	6	318	6	25	92	4	19
SEPT	2	155	2	9	94	3	6	210	5	29	86	4	15
OCT	1	440	1	6	99	12	4	320	4	52	84	7	18
NOV	2	160	2	15	91	6	5	228	3	20	91	8	12
DEC	3	173	3	14	92	6	6	218	5	14	94	7	8
TOTAL	24	-	24	-	-	58	52	-	44	-	-	58	162
AVERAGE	-	275	-	12	96	5	-	289	-	26	91	5	14

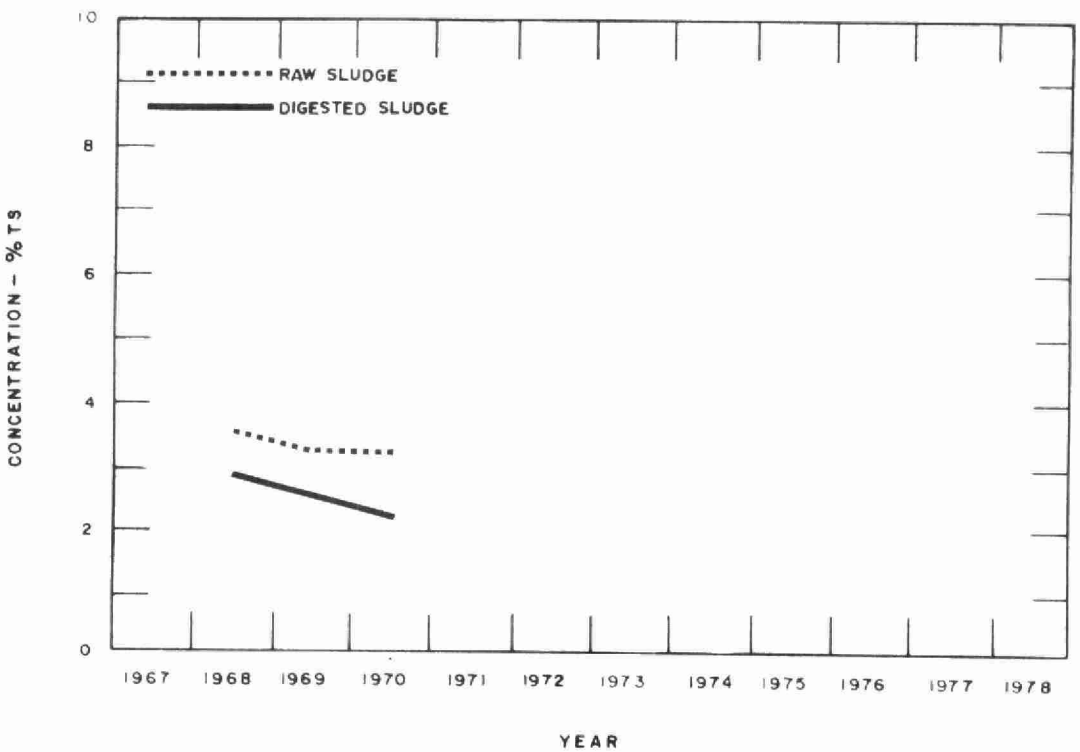
NOTE – n is the number of samples taken

AERATION

MONTH	AVG DAILY FLOW mil gal	AERATION INF.		SECONDY. EFF.		MLSS CONCN mg/l	F/M lb BOD / lb MLSS
		BOD mg/l	SS CONCN mg/l	BOD mg/l	SS CONCN mg/l		
JAN	.04	320	830	22	20	3900	.07
FEB	.04	395	1400	8	10	4520	.08
MAR	.04	190	265	13	8	3230	.05
APR	.09	140	233	8	58	2270	.10
MAY	.07	340	595	8	19	2640	.02
JUNE	.05	160	238	9	18	2480	.07
JULY	.05	125	292	23	29	3280	.04
AUG	.04	215	203	12	25	2460	.07
SEPT	.07	95	148	9	29	2570	.05
OCT	.18	150	230	6	52	2070	.01
NOV	.13	125	138	15	20	2130	.02
DEC	.11	173	110	14	14	1620	.03
TOTAL	-	-	-	-	-	-	-
AVERAGE	.07	190	288	12	26	2760	.05


VOLUME – 10^3 gal
20
16
12
8
4
0
RAW SLUDGE
DIGESTED SLUDGE
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
YEAR

DIGESTION


CONCENTRATION – % TS
10
8
6
4
2
0
RAW SLUDGE
DIGESTED SLUDGE
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
YEAR

SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME 10^3 gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10^3 gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10^3 gal	TOTAL SOLIDS %	DEWATERED cu yd	LIQUID cu yd
JAN	9	4.4	74	6	-	-	-	2.5	-	36
FEB	15	2.9	76	14	-	-	-	2.3	-	84
MAR	28	3.0	76	30	-	-	-	2.4	-	180
APR	18	2.8	76	24	-	-	-	2.4	-	142
MAY	25	3.3	77	16	-	-	-	2.2	-	96
JUNE	19	3.1	77	16	-	-	1	2.0	-	96
JULY	31	3.0	79	18	2.3	72	4	1.5	-	108
AUG	20	3.0	76	9	-	-	10	1.0	-	54
SEPT	20	3.0	76	15	-	-	3	1.6	-	90
OCT	15	2.3	82	81	-	-	2	.3	-	480
NOV	35	2.6	78	16	-	-	-	-	-	96
DEC	20	6.0	70	0	-	-	2	.2	-	0
TOTAL	255	-	-	245	-	-	22	-	-	1462
AVERAGE	21	3.3	76	22	2.3	72	-	1.7	-	133

Water management in Ontario